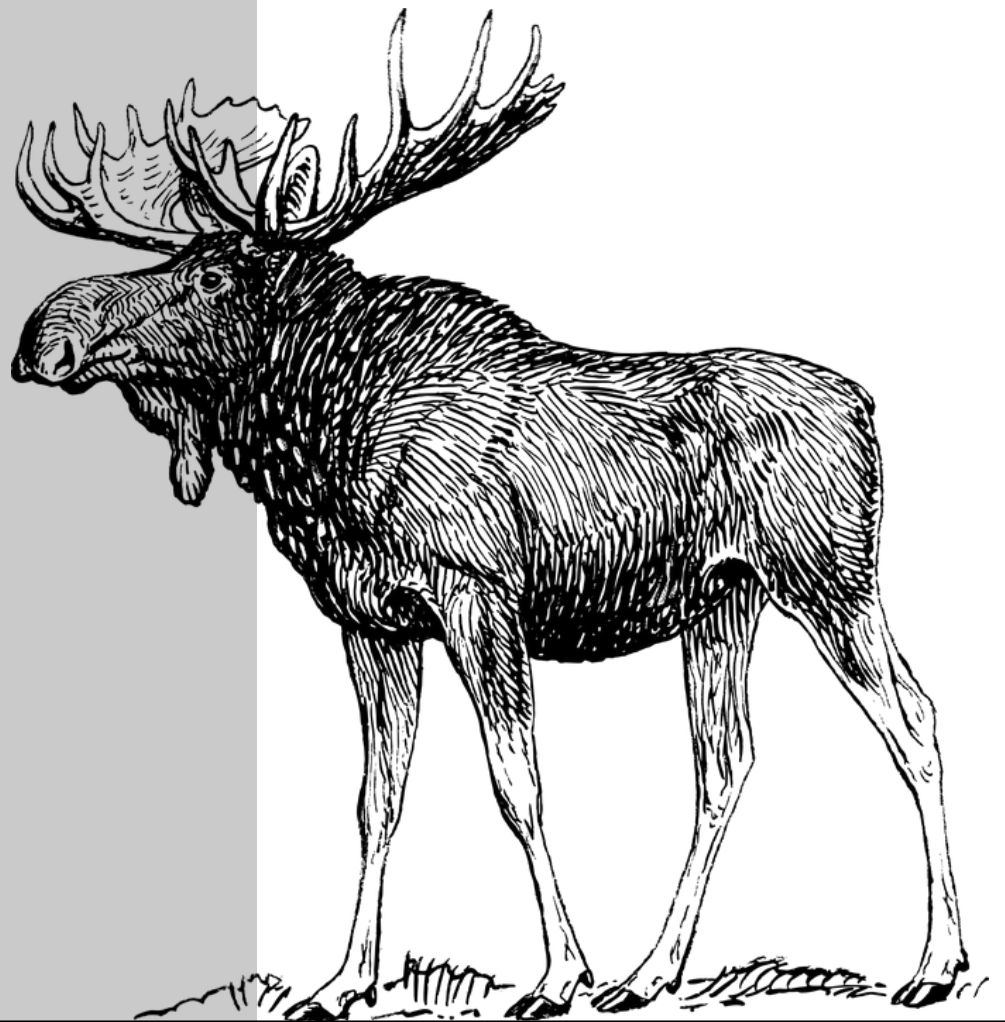

Public Awareness of and Attitudes toward Moose in New York State



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Prepared by:

Nancy A. Connelly, T. Bruce Lauber, Richard C. Stedman, and Heidi Kretser
Center for Conservation Social Sciences
Department of Natural Resources
Cornell University



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INTRODUCTION

The New York State Department of Environmental Conservation (DEC), Bureau of Wildlife is responsible for the management of moose in New York State (NYS). Currently, DEC estimates that there are approximately 400 moose living in northern New York, mostly within the Adirondack Park. DEC is in the process of developing a management plan for moose in the state. They asked the Center for Conservation Social Sciences (CCSS) at Cornell University to undertake research to provide them with information on key stakeholders' attitudes, concerns and interests related to current and potential future moose populations and impacts. DEC intends to use this information in their plan development. We will be focusing on three stakeholder groups in this research project: (1) NYS residents (i.e., general public), (2) landowners in the primary and peripheral moose ranges in New York, and (3) large private forestland owners and managers in northern New York.

In the first of three research efforts, reported herein, we report on information from the first stakeholder group-- NYS residents—focusing on their awareness of moose in New York, and their interests in or concerns with moose. The information was gathered via several questions on an annual statewide survey of New York State residents conducted by Cornell University.

METHODS

Nine questions were included as part of the 2019 Empire State Poll (ESP 2019). These questions assessed: (1) awareness of moose presence in NYS, (2) the importance of various benefits associated with moose in NYS, (3) concern with potential negative moose-related impacts, and (4) the desire for moose population change. (See Appendix A at the end of this document for the exact wording of the questions.) The poll, conducted by telephone by the Survey Research Institute (SRI) at Cornell University, was a general survey of NYS residents aged 18 and over. It was a survey combining an annual core of community, economic, and social science modules and questions submitted by academic researchers.

The survey sample consisted of a random sample of telephone numbers covering both cellular and land-line exchanges for New York State. The phone numbers were purchased from Marketing Systems Group. For households included in the sample, every adult in the household had an equal chance of being included in the poll. The sampling frame used within the ESP 2019 allows the poll results to be generalized to the entire state. Interviews were conducted with 800 people, 400 upstate and 400 downstate. (Downstate was defined as residents of Bronx, Kings, Nassau, New York, Richmond, Rockland, Queens, Suffolk, and Westchester Counties.) Statewide generalizations were made by weighting the data according to the population living in each region.

Telephone survey data collection began on February 18, 2019 and ended on April 23, 2019. Interviews were conducted in English or Spanish using a Computer Assisted Telephone Interviewing software system.

We compared responses to the nine questions across socio-demographic characteristics including gender, race, age, marital status, employment status, education level, household income, social ideology, and political party affiliation. Socio-demographic comparisons provide context for understanding responses to the nine questions. We report only those comparisons with statistically significant differences. We used regression analysis to identify the factors influencing people's desired future moose population levels.

RESULTS

Over 13,000 telephone numbers were included in the initial sample. The majority of these numbers were either non-working numbers or no one answered the telephone after multiple contacts. From the original sample, 2,049 telephone contacts were made. Almost 40% of the contacts resulted in completed interviews. Twenty-one percent refused to be interviewed. The remaining contacts were deemed ineligible because the person lived outside of New York State, did not speak English or Spanish, the telephone number was not a household, or the telephone number connected to a minor's cell phone.

By design, half of the respondents came from upstate counties and the other half from downstate counties. When the data were weighted to reflect the population of NYS residents, the respondent distribution consisted of almost equal numbers of men and women, was two-thirds white, with a mean age of 48, and a diverse range of education levels (Table 1).

The socio-demographic characteristics of gender, race, age, education, household income, social ideology, and political party affiliation had statistically significant relationships with some of the nine questions about moose. The other socio-demographic characteristics--marital status and employment status-- were not significantly correlated with any of the nine questions. Results for the nine questions are presented in subsequent tables with the overall response to the question first, followed by responses categorized by other variables with which the responses were significantly correlated.

We found that almost half (49%) of NYS residents knew moose lived in NYS and 13% indicated they had seen a moose in the wild in the state (Table 2). About one-third (32%) of NYS residents were unsure if moose lived in NYS, with the remainder (18%) believing that moose did not live in the state. (If respondents were unsure or did not think moose lived in NYS, the interviewer told them that there were a few moose living in northern New York before asking further questions.) Upstate residents were more likely to know that moose lived in the state and to have seen a moose in the wild than downstate residents. Downstate residents were more likely to be unsure if moose lived in the state. Those with a high school education or greater, and those who were white were more likely than their counterparts to know moose lived in the state. These groups were not, however, more likely to have seen a moose in the wild. Asian respondents were less likely than all other racial groups to have seen moose in the wild in the state.

Table 1. Socio-demographic characteristics of our sample of NYS residents.

	Percent
<u>Gender</u>	
Male	50.7
Female	49.3
<u>Race*</u>	
White	67.8
Black	18.4
Asian	8.3
Hispanic	18.4
<u>Education</u>	
Less than high school	6.7
High school grad	16.9
Some college	26.6
College grad	29.3
Graduate degree	20.5
<u>Marital status</u>	
Married	46.9
Divorced, separated	11.2
Widowed	3.8
Single	38.1
<u>Employment status</u>	
Employed	57.9
Not working for pay	21.8
Retired	16.0
Disabled	3.2
Unable to work	1.1
<u>Social ideology</u>	
Liberal	35.3
Middle of the road	35.8
Conservative	29.0

Table 1 (cont.)

	Percent
<u>Political party affiliation</u>	
Democrat	39.1
Independent	39.9
Republican	17.6
Other party	3.3
<u>Household income</u>	
\$0 to < \$50,000	33.5
\$50,000 to < \$100,000	32.3
\$100,000 to <\$150,000	14.9
More than \$150,000	19.3
<u>Mean age</u>	48.0

*Categories are not mutually exclusive.

Table 2. NYS residents' knowledge of and experience with moose in New York State--overall and by variables with a statistically significant relationship using chi-square test.

	Know moose live in NYS (%)			Saw a moose in the wild in NYS (%)
	Yes	No	Don't know/Unsure	
Overall	49.4	18.2	32.4	12.7
NYS Region*, **				
Downstate	44.7	16.6	38.7	9.3
Upstate	57.8	21.0	21.3	18.8
Education*				
Less than high school	26.4	15.1	58.5	16.7
High school graduate	43.7	23.7	32.6	8.2
Some college	51.4	17.5	31.1	16.0
College graduate	52.6	18.8	28.6	11.7
Graduate degree	55.9	13.0	31.1	12.3
Race				
White ^a	55.4	18.0	26.6	14.0
Black ^a	40.1	17.7	42.2	8.2
Asian ^b	43.1	15.4	41.5	4.7
Hispanic ^a	36.1	17.7	46.3	12.2

*Significant difference for knowing moose live in NYS between upstate/downstate and education levels at $P < 0.05$ using chi-square test.

**Significant difference for seeing moose between upstate/downstate at $P < 0.05$ using chi-square test.

^aSignificant difference for knowing moose live in NYS between respondents in racial group specified and all other respondents at $P < 0.05$ using chi-square test.

^bSignificant difference for seeing moose between respondents in racial group specified and all other respondents at $P < 0.05$ using chi-square test.

We asked about several benefits that people associate with moose living in NYS. Two-thirds of NYS residents indicated that they liked knowing moose lived in the state and they would like people to have the opportunity to see moose in the wild in NYS (Table 3). One-third were neutral or disagreed with the statement. Upstate residents and white residents were more likely to agree with these statements, but still over 60% of downstate residents and over 50% of non-white residents agreed as well. Those who knew (before our telephone call) moose lived in NYS and those who had seen a moose in the wild were more likely to agree with these statements compared with those who were not aware or unsure.

Equal numbers of respondents agreed that people should have the opportunity to hunt moose if the population got large enough in NYS (42%) and disagreed (41%); less than 20% were neutral (Table 3). Almost 60% of upstate residents agreed that people should have the opportunity to hunt moose if the population got large enough in NYS compared to 33% of downstate residents. Almost 50% of downstate residents disagreed. Non-white and female residents were more likely to disagree that people should have the opportunity to hunt moose than whites and males. People who identified themselves as having a conservative ideology were more likely to agree that people should have the opportunity to hunt moose than those with a liberal ideology. Those who knew (before our telephone call) moose lived in NYS were more likely to think people should have the opportunity to hunt moose compared with those who were not aware or unsure. Those who had seen a moose in the wild were equally split between those agreeing that people should have the opportunity to hunt moose versus disagreeing (46% vs. 44%), with fewer (<10%) being neutral.

Table 3. People's views on various benefits of having moose in NYS--overall and by variables with a statistically significant relationship.

Benefits associated with moose in NYS	Level of agreement/disagreement (%)				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I like knowing that moose live in NYS					
Overall	35.8	28.6	29.2	3.9	2.4
NYS Region*					
Downstate	30.9	29.6	30.9	5.3	3.3
Upstate	44.5	26.8	26.3	1.5	1.0
Race*					
White	43.0	26.5	26.9	2.0	1.5
Non-white	20.9	33.2	33.2	7.9	4.7
Know moose live in NYS					
Yes ^a	45.9	27.3	23.2	2.3	1.3
No ^b	35.2	24.8	31.0	4.8	4.1
Don't know/Unsure ^b	20.9	32.9	37.2	5.8	3.1
Saw a moose in the wild in NYS*					
Yes	50.0	35.0	9.0	5.0	1.0
No	33.8	27.6	32.2	3.8	2.6
I would like people to have the opportunity to see moose in the wild in NYS					
Overall	33.6	34.0	25.1	5.7	1.7
NYS Region*					
Downstate	31.3	33.3	26.6	7.0	1.8
Upstate	37.5	35.3	22.5	3.3	1.5
Race*					
White	35.9	34.8	24.2	3.9	1.3
Non-white	28.9	32.4	26.6	9.8	2.3
Know moose live in NYS					
Yes ^a	44.8	31.4	20.5	2.5	0.8
No ^b	29.7	35.9	23.4	8.3	2.8
Don't know/Unsure ^b	18.2	37.2	33.3	8.9	2.3

Table 3 (cont.)

	Level of agreement/disagreement (%)				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Saw a moose in the wild in NYS*					
Yes	45.1	37.3	10.8	5.9	1.0
No	31.8	33.4	27.3	5.6	1.9
I think people should have the opportunity to hunt moose, if the moose population gets large enough in NYS					
Overall	13.4	28.7	17.0	20.7	20.2
NYS Region*					
Downstate	9.3	23.8	17.5	25.3	24.1
Upstate	20.8	37.5	16.0	12.5	13.3
Race*					
White	15.5	33.1	16.8	18.2	16.4
Non-white	9.4	19.1	17.6	26.2	27.7
Gender*					
Male	17.8	31.4	16.3	19.3	15.1
Female	9.2	25.6	17.4	22.3	25.6
Social ideology					
Conservative ^a	18.2	30.2	18.2	18.2	15.1
Middle of the road ^{a, b}	15.1	29.7	15.8	20.1	19.4
Liberal ^b	8.4	27.6	17.8	22.2	24.0
Know moose live in NYS					
Yes ^a	19.3	30.2	15.0	16.5	19.0
No ^b	8.2	31.5	13.7	24.7	21.9
Don't know/Unsure ^b	7.8	24.5	21.8	24.9	21.0
Saw a moose in the wild in NYS*					
Yes	23.5	22.5	9.8	30.4	13.7
No	11.8	29.5	18.0	19.5	21.2

*Significant difference in agreement/disagreement between groups in each category at $P < 0.05$ using t-test.

^{a, b}Values without a letter in common are significantly different from each other at $P < 0.05$ using Scheffe's test.

We asked about three potential concerns people might have about moose in NYS: 1) the possibility of moose-vehicle collisions occurring in NYS, 2) moose damage to forests and plants in NYS, and 3) the moose population in NYS might decline in the coming years. Less than one-third of people were moderately or very concerned about any of these possibilities. The most common concerns were that moose populations might decline in the coming years and the possibility of moose-vehicle collisions occurring in NYS, for which 57% and 54% of people, respectively, had at least some level of concern (Table 4). Moose damage to forests and plants was at least somewhat of a concern for 32% of NYS residents. Respondents who knew (before our telephone call) that moose lived in NYS were more concerned about moose-vehicle collisions and the possibility of a declining moose population than those who did not know that moose lived in the state.

Concern about moose-vehicle collisions and moose damage to forests and plants were viewed similarly by certain socio-demographic groups. We found that downstate residents, non-white residents, women, and those who identified their political party affiliation as Democrat had the highest level of concern about these two issues. Those with a college degree or higher were less concerned about moose damage to forests and plants than those without a high school diploma. We found those who considered themselves to be liberal were more concerned about the possibility of a declining moose population than “middle of the road” people, who were in turn more concerned than conservatives. The majority of conservatives were not at all concerned or had no opinion about the possibility that the moose population might decline in NYS in the coming years.

Over 40% of study participants had no opinion about how they would like to see the moose population change in the coming years (Table 5). Those living downstate and those who had not seen a moose in NYS were most likely to have no opinion. Of those who had an opinion, almost everyone wanted to see an increase in the moose population or have it remain the same in the future; very few wanted a decrease. Those most likely to want a population increase were those who were younger, male, white, or lived upstate. People who knew moose lived in NYS also were more likely to want the population to increase.

Table 4. Level of concern for three possible impacts of having moose in NYS--overall and by variables with a statistically significant relationship.

Possible concerns with moose	Level of concern (%)				
	Not at all concerned	Slightly concerned	Moderately concerned	Very concerned	No opinion
Moose-vehicle collisions occurring in NYS					
Overall	30.5	23.8	17.0	13.0	15.7
NYS Region ^{*,**}					
Downstate	25.3	24.1	16.8	15.5	18.3
Upstate	39.8	23.3	17.3	8.5	11.0
Race ^{*,**}					
White	34.2	24.9	17.8	9.9	13.2
Non-white	22.4	21.6	14.9	20.0	21.2
Gender [*]					
Male	33.8	23.9	17.2	10.4	14.7
Female	27.3	23.7	16.3	15.8	16.8
Political party affiliation					
Democrat ^a	26.1	27.8	17.6	14.7	13.7
Independent ^{a,b}	31.2	20.9	16.7	11.9	19.3
Republican ^b	37.0	23.2	17.4	8.0	14.5
Know moose live in NYS					
Yes ^a	25.8	27.1	21.3	12.7	13.2
No ^b	45.2	15.8	10.3	14.4	14.4
Don't know/Unsure ^{a,b}	29.5	23.6	14.3	12.4	20.2
Moose damage to forests and plants in NYS					
Overall	45.5	15.5	9.6	7.1	22.2
NYS Region ^{*,**}					
Downstate	38.3	15.3	11.3	10.3	24.8
Upstate	58.3	16.0	6.8	1.5	17.5
Race [*]					
White	51.4	14.5	8.8	3.7	21.6
Non-white	32.0	18.0	11.7	14.5	23.8

Table 4 (cont.)

	Level of concern (%)				
	Not at all concerned	Slightly concerned	Moderately concerned	Very concerned	No opinion
Moose damage to forests and plants in NYS (cont.)					
Gender [*]					
Male	52.5	14.4	8.2	5.0	20.0
Female	38.5	16.6	11.0	9.4	24.5
Political party affiliation					
Democrat ^a	41.0	14.7	10.4	9.8	24.1
Independent ^a	41.9	16.3	8.9	7.3	25.6
Republican ^b	61.2	15.1	9.4	0.7	13.7
Education					
Less than high school ^a	31.5	14.8	5.6	18.5	29.6
High school graduate ^{a,b}	43.3	17.2	11.9	6.0	21.6
Some college ^{a,b}	40.6	17.5	11.8	7.5	22.6
College graduate ^b	47.9	17.1	6.8	6.0	22.2
Graduate degree ^b	54.3	9.3	11.1	4.9	20.4
Moose population in NYS might decline in the coming years					
Overall	21.6	21.5	20.7	15.3	20.9
Social ideology					
Liberal ^a	13.5	21.8	25.5	18.2	21.1
Middle of the road ^b	21.5	24.7	21.5	12.9	19.4
Conservative ^b	31.3	17.9	13.8	14.3	22.8
Know moose live in NYS ^{**}					
Yes ^a	19.8	21.4	23.9	17.6	17.3
No ^b	29.2	20.1	13.9	13.2	23.6
Don't know/Unsure ^{a,b}	20.1	22.4	19.7	12.7	25.1

^{*}Significant difference in level of concern (no opinions excluded) between groups in each category at P<0.05 using t-test.

^{**}Significant difference between those with an opinion versus those without at P<0.05 using chi-square test.

^{a,b}Values without a letter in common are significantly different from each other at P<0.05 using Scheffe's test.

Table 5. Desired moose population trend in NYS--overall and by socio-demographic and awareness variables with a statistically significant relationship.

	Moose population trend desired (%)			
	Decrease	Stay the same	Increase	No opinion
Overall	2.4	24.1	31.7	41.8
NYS Region ^{*,**}				
Downstate	3.3	25.8	26.3	44.6
Upstate	1.0	21.0	41.3	36.8
Race [*]				
White	1.1	24.2	34.6	40.1
Non-white	5.5	23.8	25.4	45.3
Gender [*]				
Male	1.7	22.1	36.2	40.0
Female	3.3	25.8	27.0	43.9
Age				
18-34 ^a	0.0	22.8	36.3	40.9
35-49 ^{a,b}	2.5	21.2	35.9	40.4
50-64 ^{a,b}	4.5	23.0	28.8	43.7
65+ ^b	2.5	30.9	24.7	42.0
Know moose live in NYS [*]				
Yes	2.3	22.1	37.3	38.3
No or Don't know/Unsure	2.7	26.1	26.3	44.9
Saw a moose in the wild in NYS ^{*,**}				
Yes	1.0	21.8	48.5	28.7
No or Don't know/Unsure	2.6	24.5	29.1	43.8

^{*}Significant difference in population trend desired (no opinions excluded) between groups in each category at P<0.05 using t-test.

^{**}Significant difference between those with an opinion versus those without at P<0.05 using chi-square test.

^{a,b} Values without a letter in common are significantly different from each other at P<0.05 using Scheffe's test.

People's opinions about some benefits and concerns were associated with the type of population change desired. Those who liked knowing moose lived in NYS and those who would like people to have the opportunity to see moose in the wild were more likely than others to want a population increase (Table 6). People who were moderately or very concerned about moose damage to forests and plants were less likely than others to want an increase in the population. As one might expect, those who were moderately or very concerned that the moose population might decline in the coming years were more likely to want a population increase than those who were slightly concerned, who in turn were more likely to want an increase than those who were not at all concerned.

Table 6. Desired moose population trend in NYS by benefit and concern variables with a statistically significant relationship.

Potential benefits and concerns with moose in NYS	Moose population trend desired (%)			
	Decrease	Stay the same	Increase	No opinion
I like knowing moose live in NYS				
Agree ^a	1.0	23.2	45.1	30.8
Neutral ^b	1.8	22.5	12.8	63.0
Disagree ^c	18.2	31.8	9.1	40.9
I would like people to have the opportunity to see moose in the wild in NYS				
Agree ^a	1.1	22.6	43.7	32.6
Neutral ^b	2.6	24.5	10.2	62.8
Disagree ^b	11.1	27.8	18.5	42.6
Moose damage to forests and plants in NYS				
Not at all concerned ^a	1.8	20.7	40.9	36.5
Slightly concerned ^{a,b}	0.8	32.8	32.8	33.6
Moderately or very concerned ^b	5.0	27.7	28.6	38.7
Moose population in NYS might decline in the coming years				
Not at all concerned ^a	3.9	30.2	18.4	47.5
Slightly concerned ^b	1.2	28.1	34.5	36.3
Moderately or very concerned ^c	0.7	19.4	54.9	25.0

^{a,b,c} Values without a letter in common are significantly different from each other at $P < 0.05$ using Scheffe's test.

As the final step in our analysis, we compared all possible variables that could explain people's desired population trend using regression analysis. We found five variables that were significant, with an adjusted R^2 for our model of 0.26. The results showed that people who wanted more moose (listed in order of importance):

- Liked knowing moose live in NYS
- Were concerned that the population might decline in coming years
- Were of a younger age
- Would like people to have the opportunity to see moose in the wild
- Had little or no concern about moose damage to forests or plants.

DISCUSSION AND MANAGEMENT IMPLICATIONS

These survey findings provide us, for the first time, with estimates of the level of awareness of moose among the general public in New York. The findings also contribute to our understanding of the value residents place on having moose in NYS, and the concerns they have about moose impacts. Differences between upstate and downstate residents, and between different socio-demographic groups provide us with background context in which to interpret their views and develop insights about who DEC might want to target with information about moose in the future.

We found that about half of NYS residents, more upstate and fewer downstate, knew that moose lived in NYS. Of those with an opinion, most wanted to see an increase in the moose population in the future, or at least have it remain at its current level.

After those who were unaware that moose lived in NYS were told that they did, subsequent questions on the benefits of moose found that two-thirds of residents valued knowing moose lived in the state, and the opportunity for people to see moose in the wild. Those who had seen moose in the wild were more likely than those who had not to like knowing moose lived in the state and they wanted people to have the opportunity to see moose in the wild in NYS.

Our results show that NYS residents are divided, almost evenly, around the benefits of allowing hunting of moose if the population becomes large enough. Support for hunting was higher upstate compared with downstate. People who have seen a moose in NYS were more likely to have an opinion on this topic, but these individuals were still evenly divided.

Few people expressed even moderate concerns about the potential for moose-vehicle collisions or moose damage to forests and plants. Only one-third of residents expressed even slight concern about moose damage to forests and plants, and those with higher education levels were even less likely to be concerned. This could be because people do not feel that this risk is important. Alternatively, they could be unaware of the feeding behaviors of moose. If managers see damage to forests as being the largest negative impact of moose currently and the general public does not share that concern, then perhaps we need to look further into why the public does not share the concern. If there is a lack of knowledge about the feeding behavior of moose and subsequent

potential damage to young forests, then education might be needed as a first step. This might be necessary before the public would support action DEC might want to take to reduce the negative impacts of moose on forests and plants.

A number of people are concerned about a possible decline in the population in the coming years, so it is logical that they would like to see efforts taken to increase the population or at least prevent a decline. In addition, we found the desire for an increase in the moose population is related to people's age, the value they place on the benefits of having moose in the state--their existence and the potential to see them in the wild, and their lack of concern or knowledge about potential impacts such as damage to forests.

In this study we focused on gathering information from NYS residents regarding their awareness of moose presence in New York, and their interests in or concerns with moose. Along with information being gathered from other key stakeholders--landowners in the primary and peripheral moose ranges in New York, and large private forestland owners and managers in northern New York, the information generated from this survey will be used by DEC as they develop their plan for moose management in NYS.

APPENDIX A: 2019 EMPIRE POLL QUESTIONS

1. Do you think moose live in New York State?

_____ No -> Actually there are a few living in northern New York State. SKIP to Q3

_____ Yes

_____ Don't know / Unsure -> Actually there are a few living in northern New York State. SKIP to Q3

2. Have you ever seen a moose in the wild in New York State?

_____ No

_____ Yes

3. How strongly do you agree or disagree with the following statements:

a. I like knowing that moose live in New York State

_____ Strongly agree

_____ Agree

_____ Neutral

_____ Disagree

_____ Strongly disagree

b. I would like people to have the opportunity to see moose in the wild in New York State

_____ Strongly agree

_____ Agree

_____ Neutral

_____ Disagree

_____ Strongly disagree

c. I think people should have the opportunity to hunt moose, if the moose population gets large enough in New York State.

_____ Strongly agree

_____ Agree

_____ Neutral

_____ Disagree

_____ Strongly disagree

4. How concerned are you about the possibility of moose-vehicle collisions occurring in New York State?

_____ Not at all concerned

_____ Slightly concerned

_____ Moderately concerned

_____ Very concerned

_____ No opinion

5. How concerned are you about moose damage to forests and plants in New York State?

- ☐ Not at all concerned
- ☐ Slightly concerned
- ☐ Moderately concerned
- ☐ Very concerned
- ☐ No opinion

6. How concerned are you that the moose population in New York State might decline in the coming years?

- ☐ Not at all concerned
- ☐ Slightly concerned
- ☐ Moderately concerned
- ☐ Very concerned
- ☐ No opinion

7. How would you like the moose population in New York State to change in the coming years?

- ☐ Decrease
- ☐ Stay the same
- ☐ Increase
- ☐ No opinion